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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,571	01/31/2006	Masayoshi Sawai	Q92871	3691

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2100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20037-3213

EXAMINER	
LAU, TUNG S	
ART UNIT	PAPER NUMBER
2863	

MAIL DATE	DELIVERY MODE
08/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,571	SAWAI, MASAYOSHI	
	Examiner	Art Unit	
	Tung S. Lau	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6-10,12,14 and 15* is/are rejected.

7)☒ Claim(s) *3,5,11 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/15/2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 9, 2, 4, 10, 12, 6, 14, 7, 15, and 8 are rejected under 35 U.S.C. 102(a) as being anticipated by D.S. Liu (Study of wire bonding looping formation in the electronic packaging process using three-dimensional finite element method, October 22, 2002).

Regarding claim 1:

D.S. Liu describes a rotation angle calculating method of a wire harness (abstract, section 3.4), in which a rotation angle of the wire harness is calculated at an arbitrary measuring point of the wire harness (fig. 3) when the wire harness is deformed from a first shape to a second shape while a fixed point of the wire

harness is fixed (fig. 15 a-f), the rotation angle calculating (fig. 12) method, comprising the steps of: setting a plurality of intermediate points between the fixed point and the measuring point of the wire harness in the second shape (fig. 12, fig. 15 a-f), wherein the fixed point (fig. 15 a-f), the measuring point and the intermediate points are set as nodes respectively (fig. 15 a-f); setting vectors (section 3.4, fig. 6, direction, angle, length) tangent (section 3.2) to the wire harness at the nodes of the wire harness in the second shape as node vectors respectively (fig. 25); calculating angles (fig. 25), each of which has a rotation direction (fig. 25, 12, up direction), wherein each of the angles is defined between the node vectors at the adjoining nodes (fig. 23, 26); adding the angles to each other so as to calculate a rotation angle having a rotation direction at the measuring point (fig. 23, 26, 27); and recording said rotation angle (fig. 23, 26, 27).

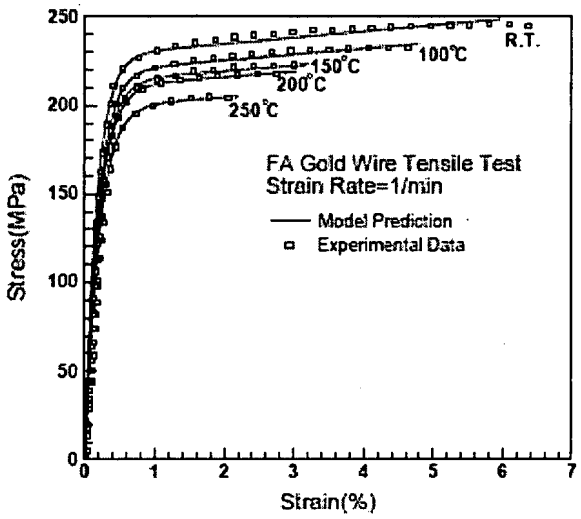

Fig. 3. Comparison of experimental data with model prediction for FA type gold wire.

Regarding claim 9:

D.S. Liu describes a rotation angle (section 3.4) calculating apparatus for calculating a rotation angle of the wire harness at an arbitrary measuring point of the wire harness when the wire harness is deformed from a first shape to a second shape while a fixed point of the wire harness is fixed, the rotation angle calculating (abstract, fig. 3) apparatus, comprising:

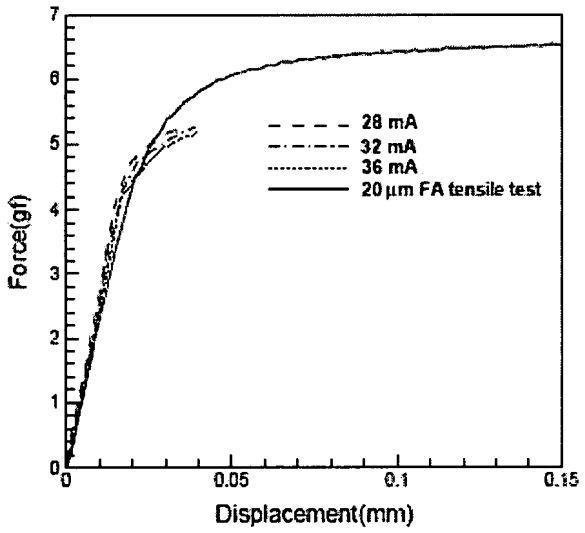

Fig. 5. Force vs displacement curve of 20 μm FA gold wire and HAZ at room temperature.

a node setting unit (abstract), which sets a plurality of intermediate points between the fixed point and the measuring point of the wire harness in the second shape (fig. 3), wherein the fixed point (fig. 5), the measuring point and the intermediate points are set as nodes respectively (fig. 3, 5); a node vector setting unit (section 3.4, fig. 6, direction, angle, length), which sets vectors tangent (section 3.2) to the wire harness at the nodes of the wire harness in the second shape as node vectors respectively (fig. 19, 23); an angles calculating unit (fig. 23, 25), which calculates angles (fig. 23, 25), each of which has a rotation direction (fig. 23, 25, 12, up direction), wherein each of the angles is defined

between the vectors at the adjoining nodes (fig. 23, 25, 26); and an angles adding unit, which adds the angles to each other so as to calculate a rotation angle having a rotation direction at the measuring point (fig. 23, 25, 26, 27).

Regarding claim 2, D.S. Liu further describes the vectors at the nodes (section 3.4, fig. 6, direction, angle, length) of the wire harness in the second shape are tangent vectors (section 3.2).

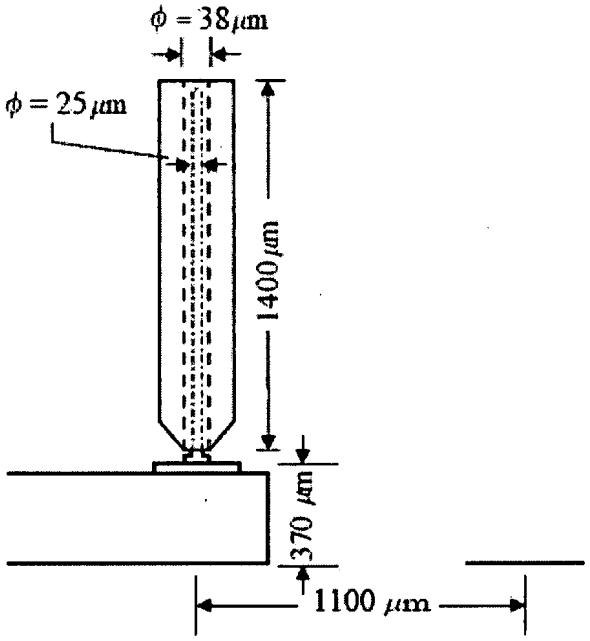

Fig. 6. The configuration of wire bond model.

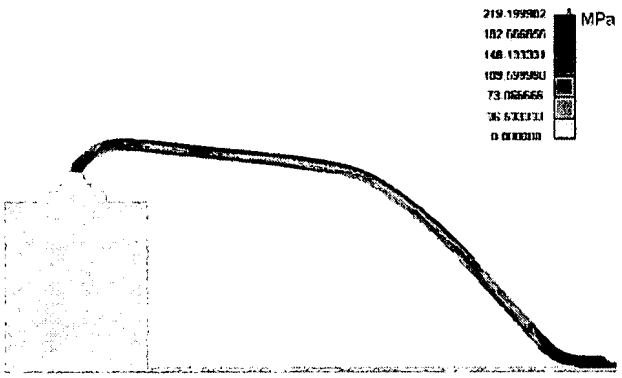

Fig. 17. Simulation result of LOW2-Mode loop with solid wire model.

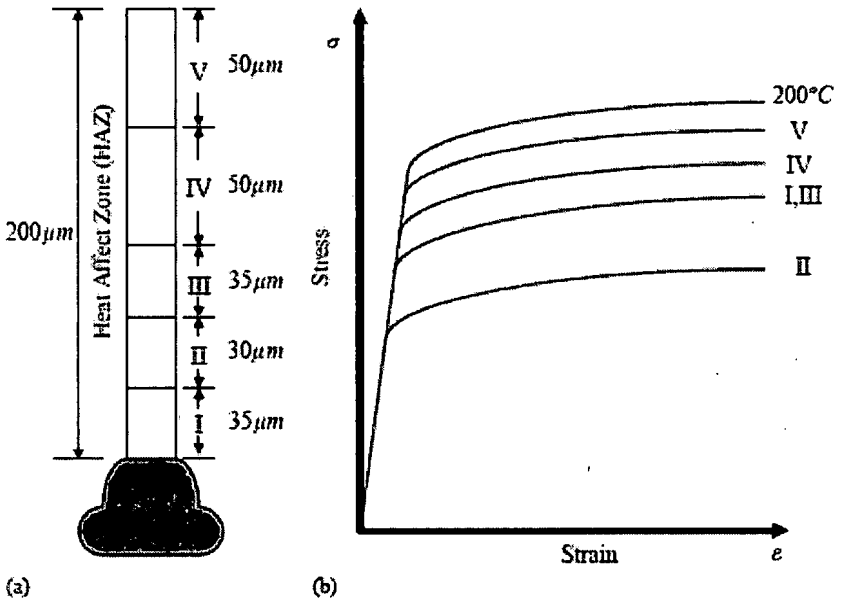

Fig. 8. (a,b) Wire property on heat affected zone (HAZ).

Regarding claim 4, D.S. Liu further describes setting a virtual shape (abstract) having a linear shape (section 3.2) which extends in a direction of a tangent (section 3.2) vector at the fixed point (section 3.4, fig. 6, direction, angle, length) in a case that both the first shape and the second shape of the wire harness are non-linear shapes (abstract); calculating a first rotation angle at the measuring point in a case that the wire harness is deformed from the virtual shape to the first shape while the fixed point of the wire harness is fixed by performing the node setting step (fig. 14, 23, 25) the vector setting step, the angles calculating step and the angles adding step (fig. 14, 23, 25); calculating a second rotation angle at the measuring point in a case that the wire harness is deformed from the virtual shape to the second shape while the fixed point of the wire harness is fixed by performing the node setting step (fig. 14, 23, 25), the vector setting step, the angles calculating step and the angles adding step (fig. 14, 23, 25); and

calculating a rotation angle having the rotation direction at the measuring point in a case that the wire harness is deformed from the first shape to the second shape based on the first and second rotation angles (fig. 14, 23, 25).

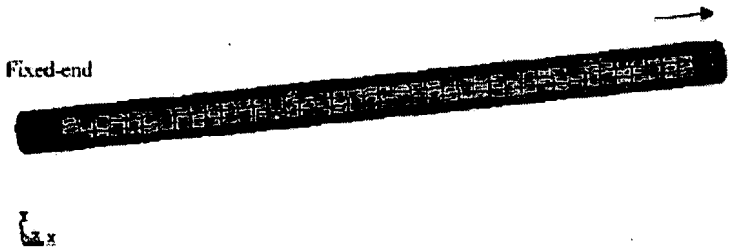

Fig. 9. Equivalent shell wire tensile test model.

Regarding claim 10, D.S. Liu further describes a computer-readable recording medium, which causes a computer to execute the rotation angle calculating (section 1, using computer).

Regarding claim 12, D.S. Liu further describes a computer-readable recording medium, which causes a computer to execute the rotation angle calculating (section 1, using computer).

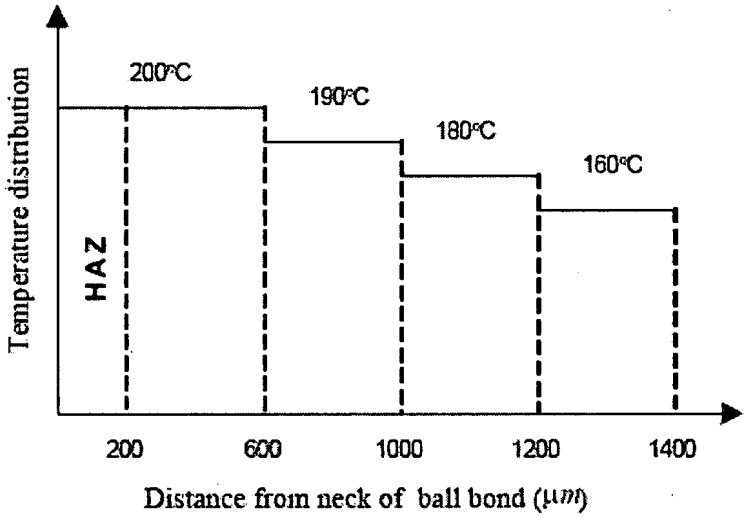

Fig. 7. Temperature distribution along wire.

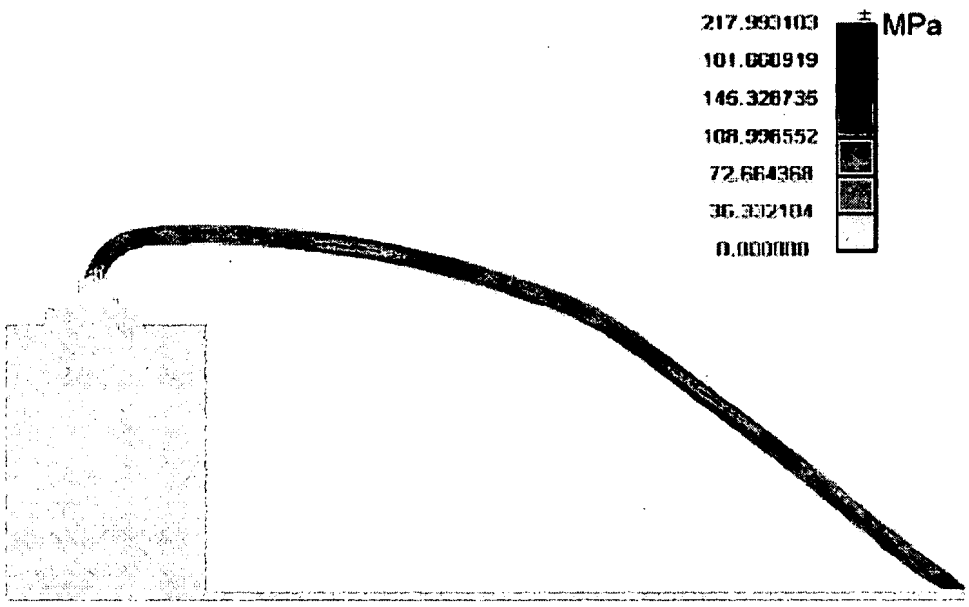

Fig. 16. Simulation result of LOW2-Mode loop with shell wire model.

Regarding claim 6, D.S. Liu further describes wherein the plurality of nodes are set on a center line of the wire harness (fig. 9, including center line of the wire).

Regarding claim 14, D.S. Liu further describes a computer-readable recording medium, which causes a computer to execute the rotation angle calculating (section 1, using computer).

Regarding claim 7, D.S. Liu further describes

the distance R is smaller than $\pi \cdot d/2$; and

"d" is a diameter of the wire harness.

(In section 3.2-3.3, R=10um, diameter of the wire is 25um, then

R is smaller than $\pi \cdot d/2$)

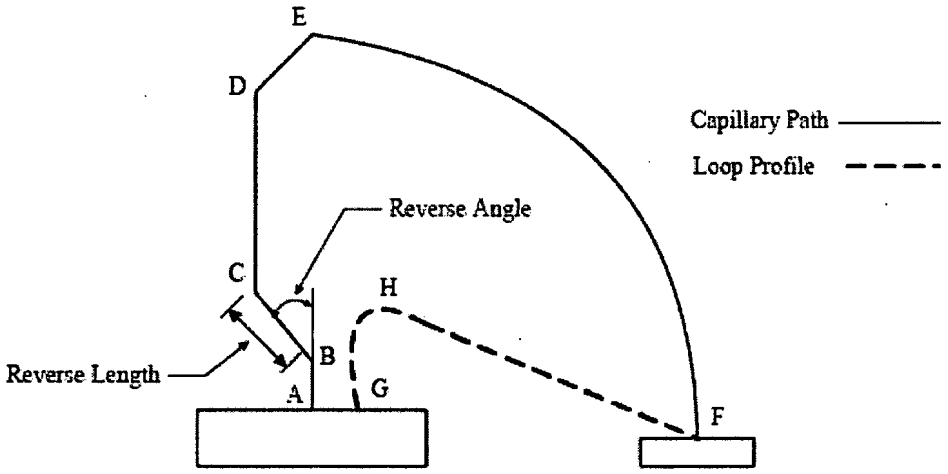

Fig. 12. Capillary trajectory and loop profile of STD2-Mode loop.

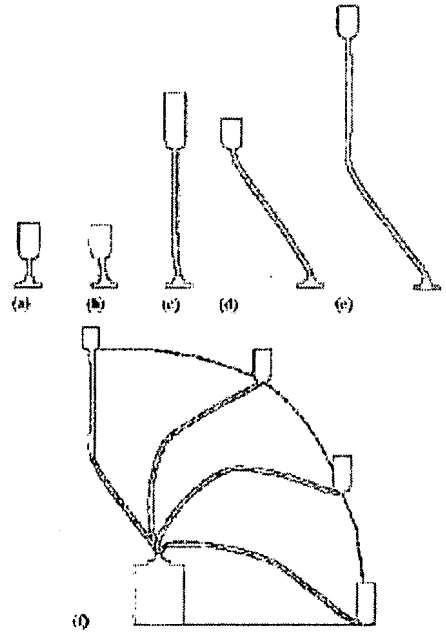

Fig. 15. (a–f) Various stages of LOW2-Mode loop formation.

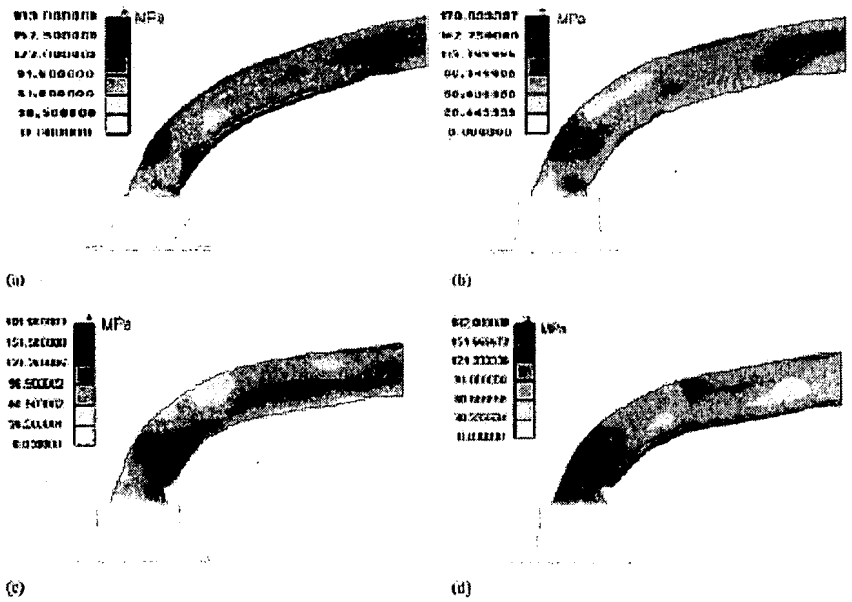

Fig. 27. Von-Mises stress distribution on HAZ for LOW2-Mode loop with various 2nd reverse angle (a) $\theta = 15°$, (b) $\theta = 30°$, (c) $\theta = 40°$ and (d) $\theta = 50°$ (1st reverse angle = 15°).

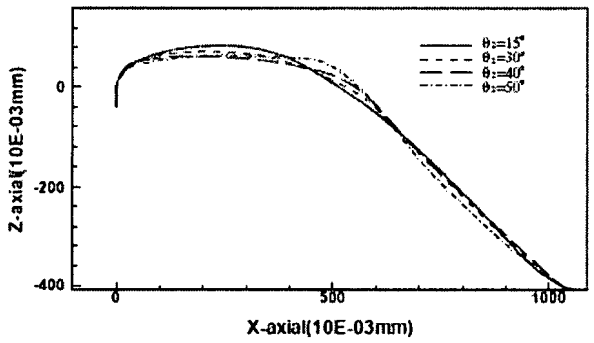

Fig. 26. Comparison of LOW2-Mode loop with different 2nd reverse angle (1st reverse angle = 15°).

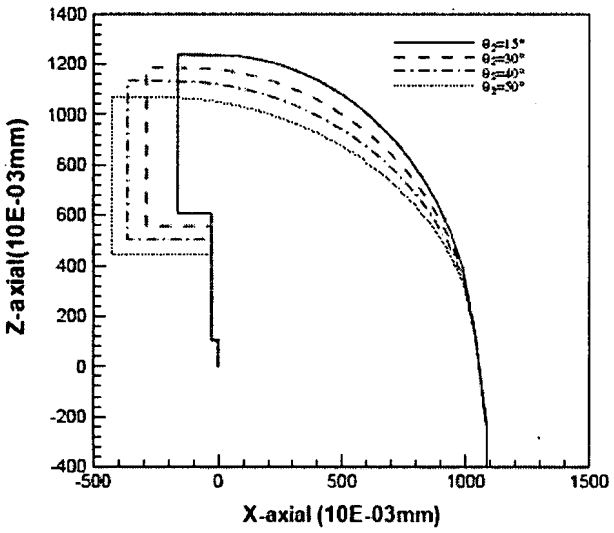

Fig. 25. Capillary trajectory for LOW2-Mode loop with different 2nd reverse angle.

Regarding claim 15, D.S. Liu further describes a computer-readable recording medium, which causes a computer to execute the rotation angle calculating (section 1, using computer).

Regarding claim 8, D.S. Liu further describes a computer-readable recording medium, which causes a computer to execute the rotation angle calculating (section 1, using computer).

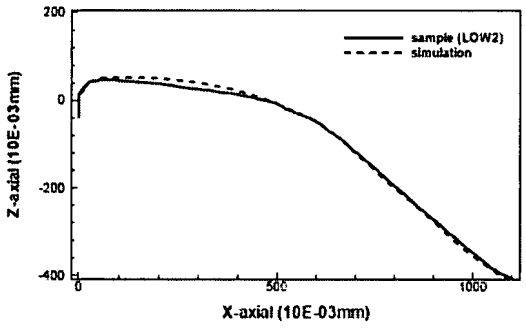

Fig. 19. Comparison between simulated and actual wirebond profile for LOW2-Mode loop.

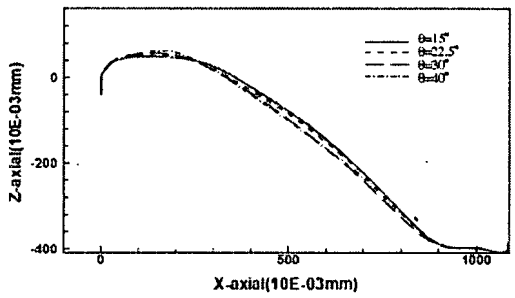

Fig. 23. Comparison of STD2-Mode loop with different reverse angle.

Allowable Subject Matter

3. Claims 3, 5, 13, and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitation of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3:

wherein the vectors at the intermediate points of the nodes of the wire harness in the second shape are sequence of points vectors which are obtained from lines connecting the respective adjoining nodes of the wire harness in the second shape; and wherein in the angles calculating step, an angle defined between the reference tangent vector and the sequence of points vector at the fixed point as a starting point, an angle having a rotation angle, which is defined between the respective sequence of points vectors at the respective adjoining intermediate points of the nodes as starting points; and an angle having a rotation angle, which is defined between the sequence of points vector directed to the measuring point and the final tangent vector are calculated.

Claims 5, 13 and 11 are objected due to their dependency on claim 3.

Response to Arguments

4. Applicant's arguments with respect to the amended claims have been considered but are moot in view of the new ground(s) of rejection. However, applicant's

arguments filed 08/15/2007 have been fully considered but they are not persuasive.

A. Applicant argues regarding objection of the drawing, 101 and previous 102 rejection are persuasive, they have been withdrawn.

Contact information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung S. Lau whose telephone number is 571-272-2274. The examiner can normally be reached on M-F 9-5:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 571-272-2269. The fax phone numbers for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tung S. Lau
AU 2863, Patent examiner
August 22, 2007